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How Effective will the energy saving be for my business?

Take a look at our traffic light system below and see where your site fits in terms of the equipment and machinery in use. The savings indications refer to the amount which could be saved using power quality management technology such as voltage optimisation, voltage stabilisation, harmonic filtration and PFC.

High Energy Saving 20% - 50%	Switch start fluorescent lighting Discharge lighting with SON metal halids Or mercury lmps with magnetic ballast. Lighting with compact fluorescent lamps and magnetic ballast Tungsten halogen lighting Fixed speed motors that are not fully loaded i.e. air conditioning, refrigeration, pumps & Fans
Modest Energy Saving 10% - 15%	Fixed speed heavily loaded motors Some older types of IT equipment and VDHS Non thermostatically controlled heating eg towel rails, hand dryers and certain types of electric heating
Little or No Energy Saving 0% - 5%	High Frequency lighting Some IT equipment Motors with variable speed drives Thermostatically controlled heating Older 440volt equipment

How much will it cost?

We don't believe in a one size fits all approach and always tailor our services and product recommendations to best suit your needs. To ensure we can present the best energy saving solution for you we undertake a no obligation Power Quality Analysis after which we can provide you with a quotation.

In some cases equipment may reduce certain harmonic content and slightly improve power efficiency but it may

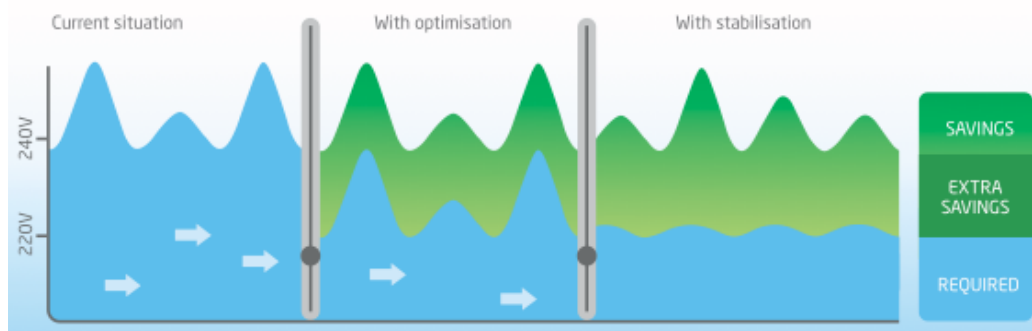
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not totally eradicate the issues. Therefore, we will always be open and honest about solutions and recommendations to help you make the right energy saving choice.

What is the difference between voltage optimisation and voltage stabilisation?

Voltage optimisation represents a cost effective way to reduce costs and increase your green credentials. If your site is not complex, your budget is severely constrained and minimum payback is more important than maximum savings then voltage optimisation is probably right for you.

Voltage stabilisation on the other hand offers a more comprehensive solution particularly to more complex situations. It allows bigger savings to be realised over a longer term and at the same time solves electrical and engineering problems that may be inherent in your site.



The most common problems associated with voltage instability are:

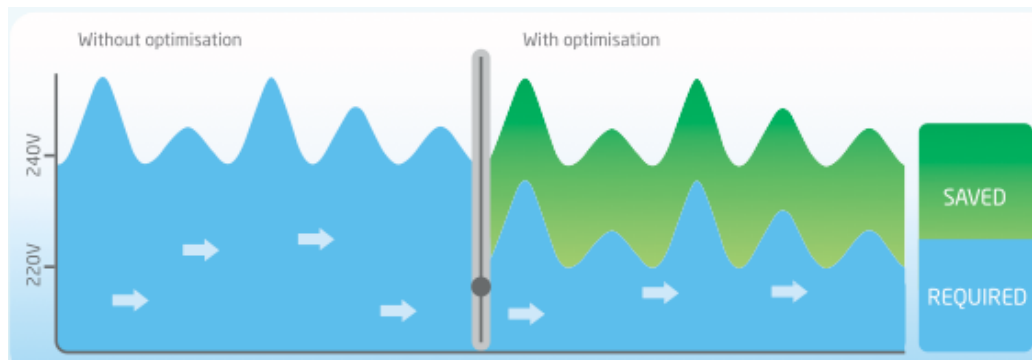
- o Power failure
 - o Loss of data
 - o Reject Products
 - o Production interruption
 - o Higher energy consumption by appliances
 - o Appliance failure and faults
 - o Production quality
 - o Safety and security issues
-

What type of equipment is voltage optimisation best suited to?

Some examples of the types of equipment most suited to voltage optimisation is refrigeration, chillers/air conditioning, motors/ pumps and lighting (incandescent/fluorescent)

Why do I need voltage optimisation?

Voltage optimisation or power optimisation makes the single biggest impact to assist you in achieving your energy saving and carbon reduction targets.



The Benefits

Voltage optimisation technology gives the end-user the ability to optimise their supply locally, correcting power quality problems from the grid, and is designed to do so very e-fliciently. In the UK and Europe, voltage optimisation units have achieved average energy savings of around 13% over the last five years, making this one of the latest-growing energy saving techniques on the market_ Major businesses (including Tesco, Asda,

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RBS and Hilton Hotels, and public sector organisations such as DEFRA and the Land Registry) have adopted voltage optimisation as a front-line energy saving measure.

How can it help my business?

An optimised supply voltage can help you to:

- o Reduce losses in electrical loads, which are present due to over voltage
 - o Reduce maintenance requirements and prolong equipment lifespan
 - o Reduce your total energy consumption and electricity bills
 - o Reduce your CO2 emissions
 - o Reduce your impact on the environment
 - o Maintain your CRC commitment by making it easy to assess carbon credit requirements
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Who installs and services the equipment?

MK Energy draws on its extensive knowledge base. Our fully qualified and skilled engineers install equipment and offer a full and comprehensive after sales service. Whether your enquiry is to address power quality issues such as harmonics or power factor correction or to investigate your options in terms of Carbon Reduction, MK Energy can provide a complete power solution that meets the needs of your site.

Does the MK equipment require any maintenance?

The unit does require minor servicing like all other electrical pieces of equipment within your system and it is at three year intervals. The only moving parts within the MK unit are the chain drive on the voltage regulator and the high tensile electro-graphite rollers. We do not use carbon brushes. As well as the minor mechanical service we also ensure that all cable connections are tightened, following good engineering practice. We know that certain items of voltage optimisation are portrayed as being maintenance free. However as engineers we would never advocate putting such a vital piece of equipment within your system without including it in your standard maintenance programme.

All buildings are required by law to carry out portable appliance testing and also fixed wiring testing. You are legally obliged to complete fixed wiring testing on a 5 yearly programme.

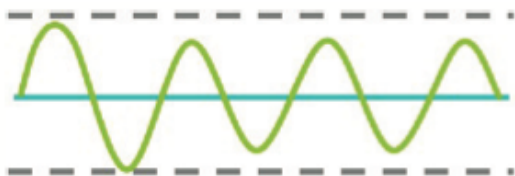
What are brownouts?

answer Brownouts are long term sags in the mains supply voltage which can last up to several days. Typical symptoms are that equipment can regularly reset or even shut down.

Common causes of brownouts are:

Heavy equipment being turned on
Starting large electrical motors
Switching off the mains supply
or just low voltage output from the generating source

Solutions – MKnet voltage stabiliser MKnet Line Conditioner or Uninterruptible Power Supply (UPS).



Why do voltage sags or dips occur?

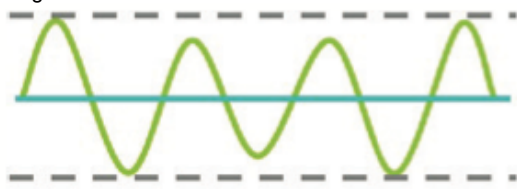
Voltage sags are short duration decreases in the mains supply voltage which generally last for several cycles. The implications for businesses can be costly and disruptive. A typical symptom is when sensitive equipment starts to lock or hang, causing data loss and system resets.

Common causes are:

Heavy equipment being turned on
Starting large electrical motors
Switching off the mains supply

Solutions – MKnet voltage stabiliser, MKnet Line Conditioning System & Uninterruptible Power Supply (UPS)

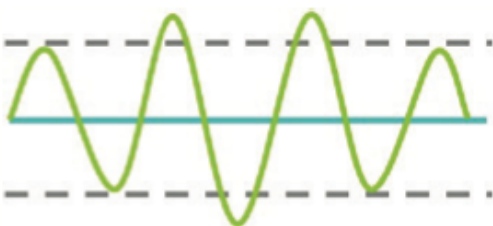
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What are over voltages & power surges?

Over voltages and power surges are short duration increases in the mains supply voltage which generally last several cycles. When surges occur equipment can suffer from premature failure. The high voltage causes wear and tear and general component degradation. This is often not noticeable until failure occurs. Unusual heat output can be an early sign of problems ahead. The most common cause is heavy equipment being turned off.

Solutions – MKnet voltage stabiliser, MKnet Line Conditioner & Uninterruptible Power Supply (UPS).



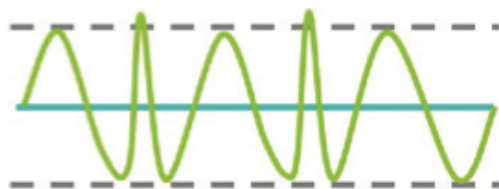
What are high voltage spikes?

High voltage spikes are very fast high energy surges or spikes in voltage lasting only a few milliseconds.

Typical symptoms include equipment locking, hanging or crashing and even suffering damage which inevitably causes data loss and corruption.

Common causes of high voltage spikes are switching of equipment, especially heavy inductive loads, arcing faults or atmospheric electrical disturbance, such as lightning strikes and static discharges.

Solutions – MKnet voltage stabiliser, MKnet Line Conditioner, Isolation Transformer and Uninterruptible Power Supply (UPS)



What are blackouts and mains failures?

When the mains supply fails completely this is known as a total mains failure or blackout. Typical symptoms are a complete disruption of equipment operation. A break in the mains supply of only several milliseconds is sufficient to crash, lock or reset many of the components that make up a typical data or voice processing IP network, such as PC, terminal, console, server, PBX, printer, modem, hub or router.

Common causes of blackouts are storms, lightning, wind and utility equipment failure. This typically occurs as a result of loss of power, a mechanical failure, or overloading by consumers.

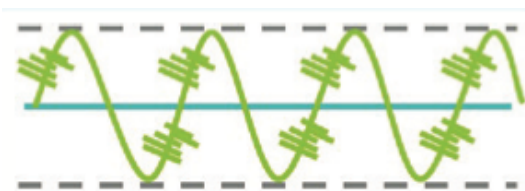
Solutions – Uninterruptible Power Supply & Diesel Generator

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What is electrical noise?

Electrical Noise is a high frequency noise either common or normal mode, which is actually high-frequency interference on the incoming mains supply. Typical Symptoms include processing errors, computer lockup and burned circuit boards.



Why do I need a survey?

How can you make a decision without knowing if there is a power quality issue? Every organisation and every plant has differing needs and therefore bespoke combinations of equipment and services should be recommended every time. The data supplied within the survey will highlight any areas we can improve your energy efficiency, reduce your maintenance costs and improve your carbon emissions. Recommendations can only be made once the survey has been completed thus justifying any capital expenditure and giving you a suitable and significant return on investment. You may only require power factor correction equipment, harmonic filtering, voltage optimisation facilities or all of the detailed equipment. But why invest in costly equipment that is not necessary

Why is there a cost for the Survey?

We charge for a comprehensive survey and make recommendations on precisely what you need. The survey can be up to 20 pages long and addresses the whole issue of site power quality. It helps to pinpoint and resolve problems that can lead to unreliable performance, equipment damage, hazardous conditions, and lowered productivity and profitability. We don't just draw up a voltage profile of a site by installing a voltage logger for seven days. This survey belongs to the customer and not to MK Energy and the report provides you with a clearly laid out summary of load and harmonic data, along with informed comments and recommendations on our findings. It is then up to the customer to determine what their course of action is whether it is with MK Energy or an alternative supplier.

What does my Survey include?

This survey will be a full power quality management survey that:

- o Identifies and quantifies harmonic related problems
- o Records the data needed to assess G5/4-1 compliance
- o Investigates 'flicker', 'sag' and other phenomena
- o Identifies PFC equipment problems, or establish PFC needs
- o Records and identifies any power savings potential
- o Records load requirements for planned distribution changes

Where do I go from here?

To assist us in providing a quotation we require the previous six to twelve months of electric utility billing data, contract, and tariff agreements.

This should also include rate structure, load usage, kW / kVA, peak demand and power factor penalty / reactive power tariff. If you are metered half hourly you can provide us with your supplier log in details and we can download the necessary data.

Once we have completed this we will visit your site and survey to highlight any power quality issues you may have on site and make recommendations as to the actions required to improve site efficiency.

What is the lead time?

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Lead times differ depending on your specific MK Energy solution however we will advise you on the expected delivery and installation date at time of order.

The manufactures in Italy, are capable of producing over 50 units a week and currently manufacture fourteen different variations of voltage stabilisers, line conditioners and voltage optimisers for worldwide supply.

Can I use smaller cables?

In our opinion it would be more cost effective to utilise the existing cables. By downsizing the cables you may be suppressing any future expansion plans and creating an unnecessary cost should there be a change in your future operation conditions. What does need to be taken into account is the sizing of the cable in relation to the physical connection to a by-pass arrangement and or protection device. We will have noted this during our initial site survey and taken into account the connection methodology.

Will there be much disruption/downtime during installation?

Initially during site preparation works there should be no disruption. Only during the final changeover will there be any possibility of disruption. The outage time will be kept to a minimum and agreed with the site before any work is carried out.

If I change my mind, can it be uninstalled?

If poorly selected, some power reduction programmes can waste your capital expenditure without the results but can also create other expensive problems – such as equipment failure, increased downtime and reduced equipment life cycle. Our advice will always be honest, we'll never promise results or savings that can't be achieved and we sit down with the client and fully explain everything prior to ordering. We ensure that you will never be in the position of having to uninstall the equipment and if you wish to test our recommendations you can by hire before you buy. If you decide to go ahead with a permanent installation, we will credit the full hire value against the purchase cost.

What if something goes wrong?

All MK voltage stabiliser units incorporate an integral "fail safe" serving two purposes;

1. To protect the stabiliser section of the unit which automatically trips in an overload situation. and ensure that you still have supply to your site although be it in an un-optimised situation
 2. You can access the internal components for servicing without having to disconnect the supply.
-

The software controlling the equipment also:

Monitors the output currents and generates an alarm in case of over current.

Monitors the maximum and minimum set voltages

Protects the stabiliser

The protection circuit interrupts the connection and in case of temporary overload the user can be supplied the mains voltage (although not stabilised) without interruptions.

This arrangement should not be confused with a full by pass facility which is required to take any of the units fully out of circuit.

How accurate are the results?

Every effort is taken to ensure the accuracy of our savings forecasts but we do rely heavily on information that is provided to us by other parties. To ensure that any savings exceed your expectations, MK Energy employs a conservative forecasting policy that ensures you will always be happy with the results. MK Energy is focused on improving the quality of your electrical supply and that's something that we guarantee completely.

How do I know savings quoted from the survey are correct?

Prior to installation the method of monitoring needs to be agreed. The site can then be monitored for an agreed period following installation and savings compared to previous data. If required, the results can then be verified by an independent energy assessor to confirm. For power factor correction CO2 savings are based upon 160 kg of CO2 produced per kVAr per year @ 500 hrs of operation per month. Figure endorsed by BCMA (BEAMA Capacitor Manufacturers Association.) For voltage reduction the annual CO2 savings is calculated using 0.557kg CO2 / kWh as per Salix calculation.

Annual NOx and PM10 savings are based on NAEI 2005 grid electricity emission factors of 0.00115208 kg NOx/kWh and 0.00005288 kg PM10/kWh.

How accurate are your survey results?

All the metering equipment used by MK Energy is subjected to a periodic calibration programme that ensures the accuracy of all readings we take from your installation.

Can I hire the equipment?

Power factor correction equipment and harmonic filters are not available for hire due to their specific tailoring to site requirements. However the MKnet and MKpower range is available for hire in order to demonstrate potential savings, justifications for capital expenditure on roll out programmes and demonstrate potential improvement to site equipment performance. We are the only company in the UK that offers this service and have a large stock of voltage optimisation units available. We will tailor any equipment hire to suit your requirements.

Can I install one unit that addresses voltage reduction, power efficiency and harmonic content?

Yes, this can be tailored to suit your individual site requirements subject to a site survey and analysis of supply. The MKnet unit is such a flexible product that additional items can be built within the unit to address harmonic distortion and power efficiency where necessary.

I don't suffer from voltage dips so why do I need stabilisation?

Are you sure this is the case. Certainly if you continue to run at your present voltage level you may not need to stabilise. When you reduce to a more optimum level such as 220v to achieve energy savings then the effects of minor dips on equipment can be more readily seen, hence the need to stabilise.

How does power factor affect my business?

All electricity authorities charge in some way for reactive power used (kvarh). This may be included in the kva demand on the account or identified separately as a reactive power charge. Until now, the penalties for presenting a poor power factor have been insignificant. But, under a new initiative implemented by OfGem, all Electricity Distribution Network Operators will be compelled to charge for any excess reactive energy consumed. This will result in consumers experiencing increased costs on their electricity bill. Therefore, power factor correction capacitors are essential for:

- o eliminating the need for larger transformers and cables etc.
- o reducing or eliminating expensive utility penalties for low power factor
- o reducing power losses in cables and transformers
- o increasing power transmission capacity in cables
- o increasing available transformer capacity
- o improving voltage stabilization in long cables
- o reducing CO2 emissions

Whatever the charge levied it can be totally eliminated by improving the power factor. Compensation by relatively low cost capacitors eliminates the need for the transmission of reactive power by the distribution network therefore It pays to have a high power factor to eliminate costs when negotiating electricity contracts.

Can the equipment be used outside?

On request our range of products can be designed for outdoor construction with stainless steel enclosures or GRP enclosures specifically manufactured for the size of unit.

Is this new technology?

The newly developed MKnet range is a simple variation of the well established Ortea voltage stabiliser.

Voltage stabilisation has been prominent in Africa and the Middle east for over forty years where voltage supply is inherently unstable. With over forty years experience in this market, the research and development of the stabiliser ranges have changed vastly and now incorporate the latest technologies and materials. The purpose of the MKnet differs to that of a traditional voltage stabiliser. Where an input voltage is unstable, a traditional voltage stabiliser has to be capable of boosting the input voltage up to the nominal value whilst coping with the corresponding increase of the current and compensating for a large input voltage variation. In this application the input current can be much higher than the output one and proportional to the input voltage.

When reducing the voltage down to an optimum site working voltage you are more likely to experience voltage dips. You may not experience these dips when running at 240volts plus and therefore run a higher potential risk of downtime should you reduce to an optimum level (220volts) without stabilisation.

Do you have an after sales service?

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With a long and proven record in the power & electrical distribution market place, MK Energy are ideally placed to offer a full and comprehensive after sales service. MK Energy combines the strengths of all our companies and offers the client a unique opportunity to draw on this through a single point of contact. Whether your enquiry is to address power issues or to investigate your options in terms of Carbon Reduction, MK Energy can provide the power solution that meets the needs of your building.

Do you have any Guarantees?

Yes, we guarantee how much you will save.

All MK equipment comes with a 15 years warranty and full term guarantee.

Our warranty includes parts and labour.

We guarantee the savings as a percentage of kWh, as per our proposal.

If the minimum savings are not achieved, you have the option to ask us to remove our system. We will do so, fully refund all costs and put the supply to its original condition.

In addition, we have a 5 year buy back guarantee. If you replace your existing system with a larger system within 5 years of buying it, we will remove it and we will credit you the cost of the smaller unit.



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